Juno Launches to Jupiter!

The solar-powered Juno spacecraft lifted off from Cape Canaveral Air Force Station in Florida at 9:25 a.m. PDT on Friday, August 5th, dazzling viewers as it thundered away from Earth to begin a five-year journey to Jupiter. Juno's detailed study of the largest planet in our solar system will help reveal the secrets of Jupiter's origin and evolution.

As the largest of the giant gas planets, Jupiter can help scientists understand the origin of our solar system and learn more about planetary systems around other stars. "With the launch of the Juno spacecraft, NASA began a journey to yet another new frontier," NASA Administrator Charles Bolden said. "The future of exploration includes cutting-edge science like this to help us better understand our solar system and an ever-increasing array of challenging destinations."

The solar-powered Juno was nestled inside the top of an Atlas V 551 rocket, the most powerful Atlas rocket in NASA's inventory. Soon after launch, the Deep Space Communication Complex in Canberra acquired the signal, and mission controllers began to receive communications from the spacecraft. Data confirmed that the massive solar arrays, the biggest on any NASA deep-space probe, deployed properly.

Juno covered the distance from Earth to the Moon (about 250,000 miles) in less than one day. It will take another five years and 1,740 million miles to complete the journey to Jupiter. Upon arrival, the spacecraft will orbit the planet's poles 33 times. Eight science instruments will probe beneath the gas giant's cloud cover to learn more about its origins, structure, atmosphere, and magnetosphere, and look for a potential solid planetary core.

With four large moons and many smaller moons, Jupiter forms its own miniature solar system. Its composition resembles that of a star, and if it had been about 80 times more massive, the planet could have become a star instead. Scott Bolton, Juno's principal investigator from the Southwest Research Institute in San Antonio, said, "Jupiter is by far the oldest planet, it contains more material than all the other planets, asteroids, and comets combined, and it carries deep inside it the story of not only the solar system but of us. Juno is going there as our emissary — to interpret what Jupiter has to say."

Juno is carrying some unusual items to honor Jupiter's history and to help inspire future explorations. Three small figurines that represent astronomer Galileo Galilei, the Roman god Jupiter, and Jupiter's wife Juno are riding along on the probe. The 1.5-inch mini-statues are part of a program developed under a partnership between NASA and the LEGO Group to inspire children to explore science, technology, engineering, and mathematics.

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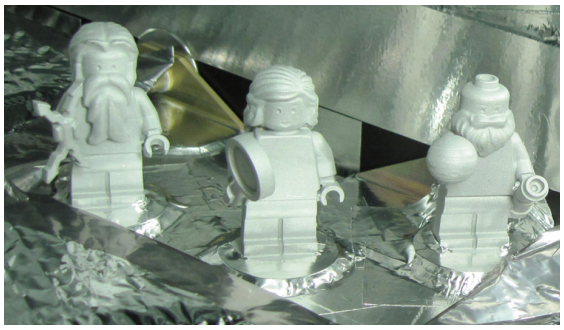
LEGO figurines shown aboard the Juno spacecraft. Credit: NASA/JPL-Caltech/KSC



In Greek and Roman mythology, Jupiter drew a veil of clouds around himself to hide his mischief. From Mount Olympus, Juno peered through the clouds and saw Jupiter's true nature. Juno holds a magnifying glass to signify her search for the truth, while her husband holds a lightning bolt. Galileo made several important discoveries about Jupiter, including the four largest moons, which are named in his honor. The miniature Galileo carries his telescope on the journey. A plaque dedicated to Galileo is also cruising to Jupiter. Provided by the Italian Space Agency, it depicts a self-portrait of Galileo and includes a passage written in his own hand in 1610 of observations of Jupiter.

Education and Pulic Outreach Highlgihts

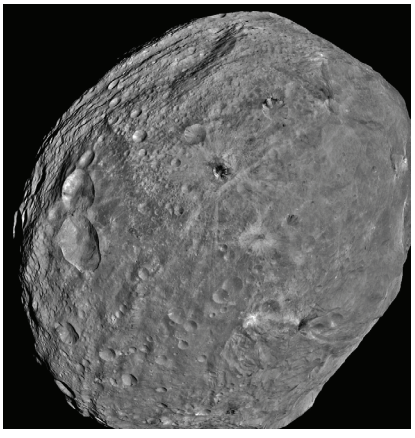
In celebration of the Juno launch, NASA held a Tweetup at the Kennedy Space Center (KSC) for 150 NASA Twitter enthusiasts. Also attending the launch were 35 students from the Goldstone Apple Valley Radio Telescope (GAVRT) project, which is one of Juno's education partners. The students and their teachers, who came from Florida, Oregon, Hawaii, Georgia, and Chile, did a Jupiter Observing Run in preparation for the launch. The GAVRT program was featured as part of NASA's Digital Learning Network Juno Webcast streamed live from KSC on August 3.

Dawn Begins Science Orbit of Vesta

The Dawn spacecraft became the first ever to orbit an object in the main asteroid belt between Mars and Jupiter when it began orbiting the rocky world Vesta on August 11. After traveling nearly four years and 1.7 billion miles, Dawn has been captured by Vesta's gravity and will spend one year getting to know its new neighbor. Dawn's instruments will collect extensive science data to provide an in-depth analysis of the asteroid. Vesta is the brightest object in the asteroid belt as seen from Earth and is thought to be the source of a large number of meteorites that fall to Earth.

Currently circling Vesta at an altitude of nearly 1,700 miles during the initial 20-day survey orbit phase, Dawn has a global view where it will take photos and collect spectra — data in different wavelengths of reflected light. Dawn will then resume thrusting its ion engine and move into the High Altitude Mapping Orbit of 420 miles for its most intensive and complex science campaign at Vesta, lasting about 30 days. Then it will spiral to a Low Altitude Mapping Orbit (LAMO), flying about 110 miles above the surface to take ultrasensitive measurements. After 10 weeks of collecting data at LAMO, it will perform another high altitude science collection for about three weeks.

Vesta captured by Dawn's framing camera. Credit: NASA/JPL-Caltech/UCLA/MPS/DLR/IDA



The first full-frame images of Vesta were captured by the framing camera on July 24 at a distance of 3,200 miles, revealing amazing surface details for the first time. These images go all the way around Vesta, since the giant asteroid turns on its axis once every five hours and 20 minutes. Visit the Vesta by Dawn Image Gallery to see the latest photos as they are released.

"Now that we are in orbit around one of the last unexplored worlds in the inner solar system, we can see that it's a unique and fascinating place," said Marc Rayman, Dawn's chief engineer and mission manager at NASA's Jet Propulsion Laboratory in Pasadena, CA.

Dawn's observations will provide unprecedented data to help scientists understand the earliest chapter of our solar system. The information will help pave the way for future human space missions. NASA Administrator Charles Bolden said that Dawn's study of Vesta marks a major scientific accomplishment and points the way to future destinations for human exploration. "President Obama has directed NASA to send astronauts to an asteroid by 2025," Bolden said, "and Dawn is gathering crucial data to inform that mission."

Vesta is considered an asteroid because of its location in the main asteroid belt. But it is much larger, at 330 miles across, than most objects in the belt, which are typically 60 miles across or smaller. Unlike asteroids, Vesta is an evolved body with a core, mantle and crust, making it more like the rocky inner planets of our solar system. But it never fully developed, perhaps due to the super-strong gravitational pull of nearby Jupiter. Vesta has survived eons of collisions that have knocked off pieces of it, making its surface possibly the oldest in the solar system. The new Dawn images show that a variety of processes took place on the surface and provide extensive evidence for Vesta's planetary aspirations.

Dawn launched in September 2007. Following a year at Vesta, the spacecraft will depart in July 2012 for dwarf planet Ceres, the largest object in the asteroid belt, where it will arrive in 2015.

It's a Vesta Fiesta!

To celebrate Dawn's remarkable feat of going into orbit around Vesta, the mission sponsored more than 100 "Vesta Fiestas" on five continents over the weekend of August 5–7, coinciding with Vesta being visible in the night sky. Events included celebrations at museums, observatories, schools, and planetaria, and a variety of other public venues with displays and activities for all ages.

The mission's education team provided extensive resources for local hosts, including recruitment and presentations materials, games

and activities, tips for observing Vesta, and contacts with local NASA-affiliated volunteers.

The flagship event at the Pasadena Convention Center attracted 1,100 participants who were eager to learn more about the mission. Over 40 mission staff and volunteers from NASA Solar System Ambassadors, JPL, McREL, and The Planetary Society combined their talents to create a celebration of space exploration. Dr. Claudia Alexander from the Rosetta mission "cooked up a comet." Kids made their own asteroid models, learned about Dawn's ion propulsion with a computer interactive game, listened to stories, and got to touch a genuine iron meteorite.

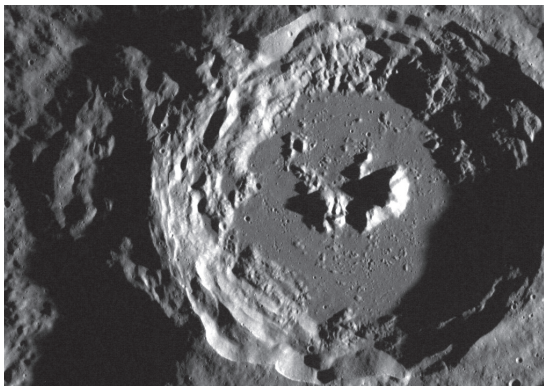
Mission scientists and volunteers used models and vivid graphics to explain the mission and answer questions. Everyone had a chance to see a large meteorite collection up close, including one that came from Vesta. Dawn team members, including principal investigator Christopher Russell, deputy principal investigator Carol Raymond, and project manager Bob Mase, spoke about the mission's history, from the initial idea to selection by NASA to the most recent science images. The talk was streamed live over NASA's Digital Learning Network.

Photos from the Pasadena event show everyone enjoying the Vesta Fiesta, including project manager Bob Mase and his family, at left.

MESSENGER Begins Historic Orbit Around Mercury

On March 17, 6-1/2 years after launch and 96 million miles from Earth, the MESSENGER spacecraft fired its main thruster and slowed the spacecraft by 1,929 miles per hour, easing it into orbit about Mercury. After traveling 4.9 billion miles and performing three flybys of the planet closest to the Sun, MESSENGER began its yearlong science campaign to understand the small rocky planet.

Continuous global mapping began April 4. The spacecraft is circling Mercury more than 700 times over 12 months, giving scientists the first global perspective on the innermost planet. Its instruments will perform the first complete reconnaissance of the Mercury's geochemistry, geophysics, geological history, atmosphere, magnetosphere, and plasma environment. Read about methods being used to study and measure impact craters.



Studying impact craters provides information not only cratering history but also on the nature and evolution of the planet's surface. This image features a crater 24 miles in diameter with terraced walls and a smooth floor, located in the plains north of Caloris basin.

MESSENGER orbits Mercury twice every Earth day. Once a day, the spacecraft stops making measurements and turns its antenna toward Earth for eight hours to send data back — via the Deep Space Network — to the MESSENGER Mission Operations Center.

Among the challenges MESSENGER faces is extreme heat. In June, the spacecraft successfully completed the first of four "hot seasons" expected to occur during its yearlong orbit. During these hot seasons, the Sun-facing side of the probe's ceramic fabric sunshade can reach temperatures as high as 350 degrees C.

These hot conditions are the result of two concurrent circumstances. Mercury is in an eccentric orbit, and its distance from the Sun varies from 43,689,229 miles to 28,816,300 miles over its 88-day revolution. The planet reached its closest distance to the Sun on June 12.

The second factor is the spacecraft's highly eccentric orbit around the planet, approaching to within 310 miles of the surface every 12 hours. The closest point of approach to Mercury's surface occurs on the sunlit side of the planet, so for almost one hour per orbit the spacecraft must pass between the Sun on one side and the hot dayside surface of the planet on the other. MESSENGER engineers took several steps to ensure that the spacecraft remains safe in spite of the extreme conditions it faces.

In a news conference on June 16, MESSENGER scientists revealed new images and science findings from the first three months in orbit. A wealth of new information confirmed some existing theories and offered many intriguing surprises.

Thousands of images of major features show the planet's surface in unprecedented detail. Photos reveal broad expanses of smooth plains near Mercury's north pole and show that the plains are likely among the largest expanses of volcanic deposits on Mercury. This confirms that volcanism shaped much of Mercury's crust throughout the planet's history.

Measurements of the chemical composition of Mercury's surface are providing important clues to the origin of the planet and its geological history. Maps of the planet's topography and magnetic field are revealing new clues to Mercury's interior dynamical processes. Scientists now know that bursts of energetic particles in Mercury's magnetosphere are a continuing product of the interaction of Mercury's magnetic field with the solar wind.

"We are assembling a global overview of the nature and workings of Mercury for the first time," said Sean Solomon, principal investigator, "and many of our earlier ideas are being cast aside as new observations lead to new insights. We can expect further surprises as our solar system's innermost planet reveals its long-held secrets."

Education and Public Outreach Highlights

MESSENGER Educator Fellows are master teachers who work directly with the mission and train other teachers in mission curriculum modules and engage students and the public at a variety of events. Six Fellows traveled to the Applied Physics Lab in Laurel, MD, for orbit insertion activities in March. They conducted web conferences and joined a two-hour live Twitter Q&A event with mission scientists. At the public event, they led educational activities and displayed mission themed art. Other Fellows hosted events in their communities during orbit insertion. In May, five Fellows attended the science team meeting and communicated what they were learning via social networking, video conferences, and face-to-face sessions once they returned home, reaching nearly 2,000 followers.

MESSENGER participated in public events including Family Science Nights at the National Air and Space Museum in Washington DC during February, March, and April, reaching 1,830 students from 30 area schools; Montana State University Astronomy Day, which drew 2,500 visitors from Montana, Wyoming, and Idaho; and North Carolina Museum of Natural Science Astronomy Days, which attracted 7,000 guests over two days. Team members distributed mission materials, showed animations, and led hands-on activities with kids.

The MESSENGER team produces and airs monthly podcasts for "365 Days of Astronomy." Find the archive of MESSENGER podcasts here.

Students in New Zealand display their MESSENGER buttons. They learned about the mission from team scientist Ann Sprague who spoke to 150 elementary and middle school students and handed out buttons and posters.

GRAIL Prepares for September Launch

The Gravity Recovery And Interior Laboratory (GRAIL) mission is undergoing tests, reviews, and all the required final preparations in anticipation of an early September launch. The twin lunar probes, called GRAIL-A and GRAIL-B, will fly in tandem orbits around the Moon for several months to measure its gravity field in unprecedented detail. The mission will also provide answers to longstanding questions about our Moon and give scientists a better understanding of how Earth and other rocky planets in the solar system formed and evolved. It will also provide important data for future lunar exploration.

The lunar-bound duo arrived at the Astrotech Space Operations facility in Titusville, FL, in late May, after completion of assembly and test at Lockheed Martin Space Systems in Denver. Since then they have undergone final testing and a series of reviews, including a launch countdown dry run, on-pad separation test, navigation and operations readiness reviews, risk assessment review, and mission success review.

GRAIL-A is lifted from its workstand and carried across the clean room toward the spacecraft adapter ring, at left, where GRAIL-B is already secured. Credit: NASA/KSC

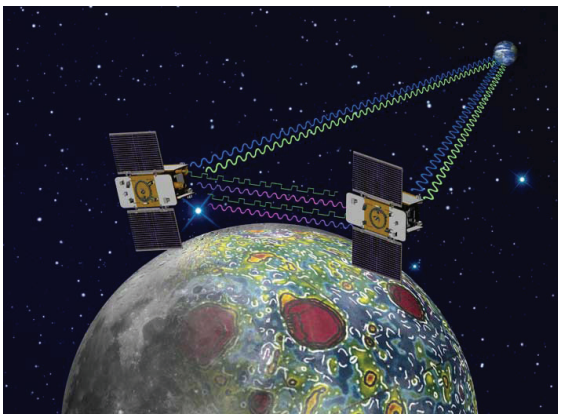
GRAIL successfully completed a Mission Readiness Review on August 9, the last project life-cycle review before launch. The twin probes completed their final inspections and were weighed one final time. They will be loaded side-by-side on a special adapter and packaged inside a payload fairing that will protect them during their launch into space. During the week of August 15, the GRAIL spacecraft will make the trip from Astrotech to Launch Complex 17 at the Cape Canaveral Air Force Station where they will be mated with the United Launch Alliance Delta II Heavy rocket.

The launch period opens September 8, 2011, and extends through October 19. For a September 8 liftoff, the launch window opens at 8:37 a.m. EDT and remains open through 9:16 a.m. EDT.

GRAIL will create the most accurate gravitational map of the Moon to date, improving our knowledge of near-side gravity by 100 times and of far-side gravity by 1000 times.

Scientists have long known that the Moon's gravity field is strangely uneven and pulls on approaching spacecraft in complex and menacing ways. Twelve U.S., Soviet, and Japanese spacecraft crashed into the Moon's surface between 1959 and 1993. The source of the gravitational quirkiness is a number of huge mascons (short for "mass concentrations") buried under the surfaces of lunar maria or "seas." Formed by colossal asteroid impacts billions of years ago, mascons make the Moon the most gravitationally lumpy major body in the solar system. To minimize the effects of mascons, orbits must be carefully chosen. GRAIL's gravity maps will help mission planners make those critical decisions for future missions. GRAIL will provide the most accurate global gravity field to date for any planet, including Earth, so future missions can navigate anywhere on the Moon.

Ultimately, the information contributed by the GRAIL mission will increase our knowledge of how Earth and its rocky neighbors in the inner solar system developed into the diverse worlds we see today.



Artist's rendering of GRAIL spacecraft at the Moon. Credit: NASA/JPL-Caltech

Education and Public Outreach Highlights

MoonKAM (Moon Knowledge Acquired by Middle school students) is GRAIL's signature education and public outreach program. Led by Sally Ride Science in collaboration with undergraduate students at the University of California San Diego, GRAIL MoonKAM will engage middle schools across the country in the GRAIL mission and lunar exploration.

Tens of thousands of fifth- to eighth-grade students will select target areas on the lunar surface and send requests to the GRAIL MoonKAM Mission Operations Center. Photos of the target areas will be sent back by the GRAIL satellites and made available in the "Images" section of the website. Students will use the images to study lunar features such as craters, highlands, and maria while also learning about future landing sites.

The GRAIL MoonKAM mission will begin in 2012 when the GRAIL satellites are in orbit around the Moon and the dedicated MoonKAM cameras are activated. The mission will last approximately 80 days. Teachers – register your classroom now! It's a fabulous opportunity for students to become part of a real space mission, and it's totally free.

New Horizons Has A New Target

The New Horizons spacecraft is safe and healthy as it continues its journey toward a flyby of Pluto, which has become even more exciting with the discovery of a fourth moon around the icy dwarf planet.

New Horizons transitioned out of hibernation on May 8 for its fifth Annual Checkout (ACO 5). Pluto Encounter Planning activities were reduced until completion of ACO 5 but the project continued to review and revise the navigation plan, develop system upgrades to accommodate new workstations, and work on contingency planning activities. ACO 5 was completed on schedule and the spacecraft resumed hibernation on July 1.

Meanwhile, astronomers using the Hubble Space Telescope during June and July discovered a fourth moon orbiting Pluto. The tiny, new satellite — temporarily designated P4 — was uncovered in a Hubble survey searching for rings around the dwarf planet.

The new moon is the smallest discovered around Pluto. It has an estimated diameter of 8 to 21 miles. By comparison, Charon, Pluto's largest moon, is 746 miles across, and the other moons, Nix and Hydra, are in the range of 20 to 70 miles in diameter.

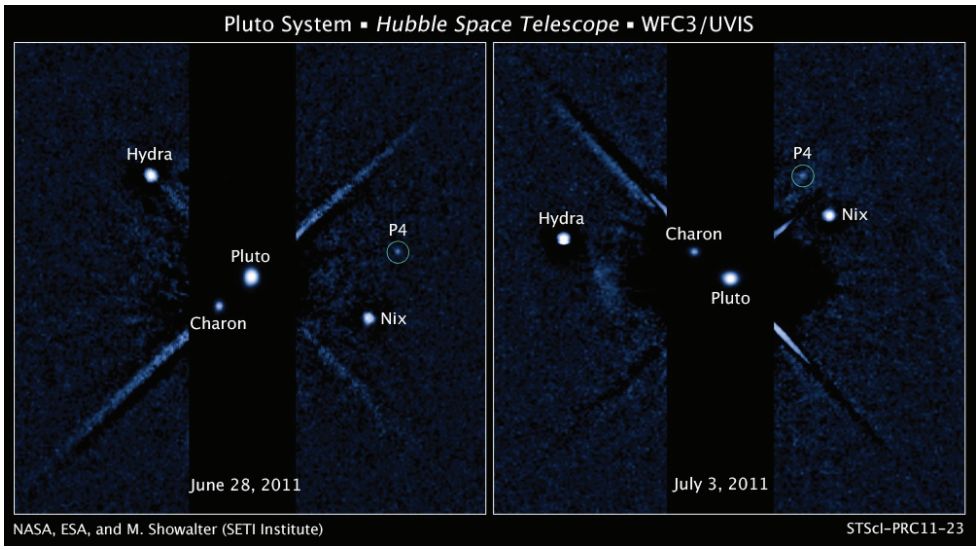
"I find it remarkable that Hubble's cameras enabled us to see such a tiny object so clearly from a distance of more than 3 billion miles," said Mark Showalter of the SETI Institute in Mountain View, CA, who led this observing program with Hubble.

The finding is a result of ongoing work to support the New Horizons mission, scheduled to fly through the Pluto system in 2015. The mission is designed to provide new insights about worlds at the edge of our solar system. Hubble's mapping of Pluto's surface and discovery of its satellites have been invaluable to planning for New Horizons' close encounter.

"This is a fantastic discovery," said New Horizons' principal investigator Alan Stern of the Southwest Research Institute in Boulder, CO. "Now that we know there's another moon in the Pluto system, we can plan close-up observations of it during our flyby. This discovery gives us another hint of what awaits us in the Pluto system. What a bonus for planetary science and for New Horizons!"

The new moon is located between the orbits of Nix and Hydra, which Hubble discovered in 2005. Charon was discovered in 1978 at the U.S. Naval Observatory and clearly resolved by Hubble in 1990 as a separate body from Pluto.

The dwarf planet's entire moon system is believed to have formed by a collision between Pluto and another planet-sized body early in the history of the solar system. The smashup flung material that coalesced into the family of satellites observed around Pluto.



These two images, taken about a week apart, show four moons orbiting the distant, icy dwarf planet Pluto. The green circle in both photos marks the newly discovered moon. Credit: NASA, ESA, and M. Showalter (SETI Institute)

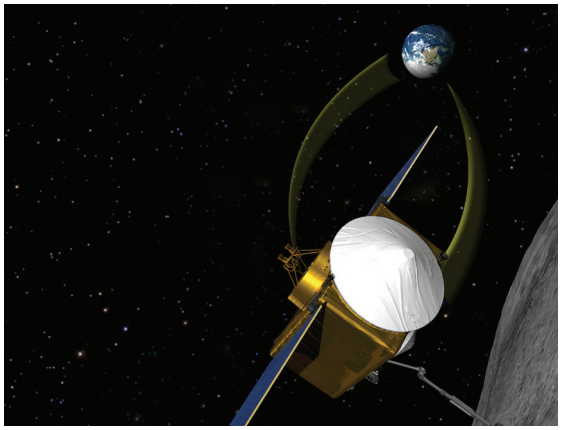
Third New Frontiers Mission Is Asteroid Sample Return

On May 25, NASA announced selection of the third New Frontiers mission — OSIRIS-REx, the first U.S. project to bring samples from an asteroid back to Earth. The Origins-Spectral Interpretation-Resource Identification-Security-Regolith Explorer, or OSIRIS-REx, mission will launch a spacecraft to an asteroid in 2016 and use a robotic arm to pluck samples that could better explain our solar system's formation and how life began.

NASA Administrator Charlie Bolden said this is a critical step in extending our reach beyond low-Earth orbit and exploring deep space. "It's robotic missions like these that will pave the way for future human space missions to an asteroid and other deep space destinations."

NASA selected OSIRIS-REx after reviewing three concept study reports for the next New Frontiers mission. The others were a sample return from the far side of the Moon and an exploration of the surface of Venus.

After traveling four years, OSIRIS-REx will approach the primitive, near-Earth asteroid designated "1999 RQ36" in 2020. Yes, this asteroid definitely needs a catchier name. Stay tuned — plans are underway for a contest to find a more suitable moniker for a space rock that's of great interest for a few different reasons. It may reveal important clues about the origin of the solar system. It could contain organic molecules, necessary for life on Earth. It also has a one-in-1,800 chance of impacting the Earth in the year 2182. The



knowledge from the mission will help scientists develop methods to better track the orbits of asteroids. So it's definitely an asteroid worth getting to know much better.

When it gets within three miles of the asteroid, the spacecraft will map the surface for six months. Once the science team chooses a suitable location, the spacecraft's arm will collect more than two ounces of material for return to Earth in 2023. The asteroid bits will be stored in a capsule similar to the one used by the Stardust mission, which returned particles of comet dust in 2006.

After landing at Utah's Test and Training Range, the OSIRIS-REx sample capsule will be taken to the Johnson Space Center in Houston where the material will be removed and delivered to research facilities for analysis by eager scientists. Pristine carbonaceous materials have never before been analyzed in laboratories on Earth. Spacecraft-based instruments cannot perform the precise analysis that can be done back on Earth — that's why sample returns are of such great value.

Michael Drake of the University of Arizona in Tucson is the mission's principal investigator. NASA's Goddard Space Flight Center in Greenbelt, MD, will manage the mission. Lockheed Martin Space Systems in Denver will build the spacecraft. The payload includes instruments from the University of Arizona, Goddard, Arizona State University in Tempe, and the Canadian Space Agency. The science team is composed of numerous researchers from universities, private and government agencies.

A kick-off meeting for the new mission took place at NASA Headquarters on July 20, including a project overview, clarification of roles and responsibilities, discussion of selection letter actions, review of Juno lessons learned, review board approach and ground-rules for partnerships. The mission team will meet at the University of Arizona in September as the project moves full speed ahead toward RQ36. Start thinking about your entry for a new name for this about-to-become-famous asteroid.

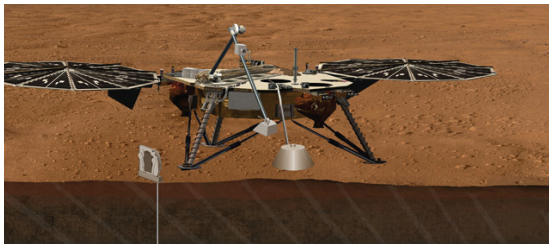
Three New Discovery Mission Candidates Announced

In May, NASA selected three science investigations that will receive $3 million each to further develop their preliminary design studies and analyses. After a detailed review of the three concept studies in 2012, one will be selected as the 12th Discovery Program mission. The selected mission will be cost-capped at $425 million, not including launch vehicle funding.

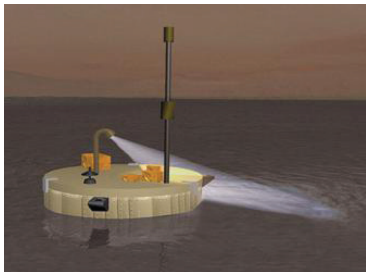
NASA requested proposals for Discovery Program spaceflight investigations in June 2010. A panel of NASA and other scientists and engineers reviewed 28 submissions. The selected investigations could reveal much about the formation of our solar system and its dynamic processes. NASA Administrator Charles Bolden said, "Missions like these hold great promise to vastly increase our knowledge, extend our reach into the solar system, and inspire future generations of explorers. NASA continues to do extraordinary science that is rewriting textbooks."

The planetary missions selected to move into the preliminary design study phase are:

• Geophysical Monitoring Station (GEMS) would study the structure and composition of the interior of Mars and advance understanding of the formation and evolution of terrestrial planets. Bruce Banerdt of NASA's Jet Propulsion Laboratory (JPL) in Pasadena, CA, is principal investigator. JPL would manage the project.



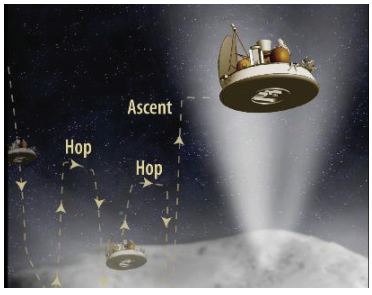
Artist's concept of the proposed Geophysical Monitoring Station for studying the deep interior of Mars. Credit: NASA/JPL-Caltech



Artist's concept of the Titan Mare Explorer floating on a sea on Titan. Credit: NASA

• Titan Mare Explorer (TiME) would provide the first direct exploration of an ocean environment beyond Earth by landing in, and floating on, a large methane–ethane sea on Saturn's moon Titan. Ellen Stofan of Proxemy Research Inc. in Gaithersburg, MD, is principal investigator. The Johns Hopkins University Applied Physics Laboratory in Laurel, MD, would manage the project.

• Comet Hopper would study cometary evolution by landing on a comet multiple times and observing its changes as it interacts with the Sun. Jessica Sunshine of the University of Maryland in College Park is principal investigator. NASA's Goddard Space Flight Center in Greenbelt, MD, would manage the project.



Artist's concept of the Comet Hopper. Credit: NASA/GSFC/University of Maryland

"Thrill of Discovery" Brings Mission Science to Teachers

On March 19, 150 educators gathered at four sites around the U.S. to experience the Thrill of Discovery and celebrate NASA's Year of the Solar System. The workshop focused on the many significant events taking place in 2011 with Discovery and New Frontiers missions: EPOXI comet Hartley 2 flyby, Stardust-NExT comet Tempel 1 flyby, MESSENGER orbit insertion around Mercury, Dawn orbit insertion around Vesta, and Juno and GRAIL launches.

Participants at all sites, plus 242 watching the webinar on the Internet, learned about current mission science from MESSENGER Principal Investigator Sean Solomon, Dawn Chief Engineer Marc Rayman, and Juno gravity science team member Ravit Helled.The webinar is archived at http://discovery.nasa.gov/tod/index.html. Teachers can show it to students in their classrooms.

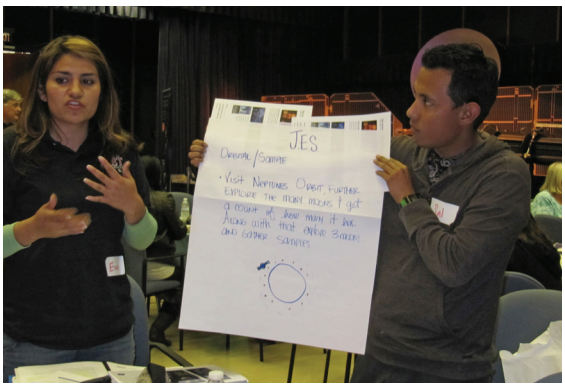
The workshops took place at the Jet Propulsion Laboratory, Pasadena; Johnson Space Center, Houston; Applied Physics Lab, Laurel, MD; and Jackson School Observatory, Champlin, Minnesota. Educators and scientists from the missions joined in at all sites.

Each location offered breakout sessions with a variety of mission-developed educational activities for all grade levels, and everyone received a large resource guide loaded with activities, DVDs, Web links, and more.

The event, which was organized by Shari Asplund, JPL, with Whitney Cobb, McREL, was extremely well received at all sites. Plans for a follow-on session are being considered.

"I thought the workshop was the best I've attended since I became a 'JPL groupie' — a very solid combination of content knowledge and classroom application ideas. I look forward to more great things in the future!"

"The Thrill of Discovery workshop was exceptional! The workbook has great information."



What's Up with "Space School Musical"

"Space School Musical," created by Kellee McQuinn from KidTribe in collaboration with the Discovery and New Frontiers Program education and public outreach, won a 2011 Telly bronze award. The Telly Awards honor the finest video and film productions, along with television programs and commercials and work created for the Web. The 32nd Annual Telly Awards received over 11,000 entries from all 50 states and 5 continents.

The musical teaches students about the solar system in such an engaging and entertaining way, they won't realize how much science they are absorbing. We recently updated the "Space School Musical" web pages with some very cool new content. A totally unique Activity Guide features fun academic, art, fitness, and life skills activities for each of the nine songs. Arts-based learning is picking up STEAM (adding Art to Science/Technology/Engineering/Math) with many in the education and science worlds, as evidence shows that the arts can enhance science education by offering tools for creative thinking, practice with the creative process, and transferable skills, helping to drive innovation.

A guide on "How to Produce the Play" includes everything a school, afterschool program, summer camp, or museum needs to put on their own amazing version of the musical. It allows students to express their creativity in multiple ways, from performing to set design to costume creation. Performers can lip-sync along with the original cast recording or sing live to the karaoke version. Participants can decide whether to put on the entire play or just a few songs. Make it your own and make it awesome!

The Gallery of photos and videos features some student productions. We'd love to add yours. Let us know about your experience with "Space School Musical," send links to your photos or videos and we'll add them to the Gallery. We are also interested in feedback about your experience. Send us your lessons learned, what worked or what didn't. We want to help everyone have the best possible experience with the musical. It is designed to be fun, rewarding, and memorable.

Students in the science club and chorus at Paradise Canyon Elementary School in La Cañada, CA, perform "Space School Musical" in April.

Winner of a 2011 Society for Technical Communication International Summit Award of Excellence

Discovery and New Frontiers News

www.nasa.gov

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